

**CLAIMS**

1. Measuring apparatus for providing information on the relative location of a target site which is radiating a target signal that includes a predetermined pulse signal, the apparatus comprising receiver means for providing a pair of temporally spaced output pulses in response to a single received said predetermined pulse signal and cross-correlation means coupled to said receiver means for cross-correlating said pair of output pulses or signals derived therefrom.
2. Apparatus according to claim 1 wherein said receiver means comprises at least two spaced receivers for providing respective ones of said pair of pulses from the same part of said received pulse signal.
3. Apparatus according to claim 2 and including direction determining means for providing a direction signal indicative of the direction of the target site from the output of said cross-correlation means and the spacing of said two receivers.
4. Apparatus according to claim 3 wherein the receiver means comprises at least three non-collinear receivers, and the direction determining means is arranged to provide at least two said direction signals from different pairs of said receivers, and to combine said at least two direction signals for providing a more precise indication of the direction of the target site.
5. Apparatus according to claim 3 wherein one said receiver is movable relative to the other between at least two positions in a direction transverse to the line joining them, and the direction determining means is arranged to provide at least two said direction signals corresponding to said two different positions, and to combine said at least two direction signals for providing a more precise indication of the direction of the target site.
6. Apparatus according to claim 3 and including rotation means for detecting rotation of the apparatus, wherein the direction determining means is arranged to combine direction signals when the apparatus is in at least two different rotational positions for providing a more precise indication of the direction of the target site.

7. Apparatus according to claim 1 for use with a target site which is emitting a said predetermined pulse signal that includes at least two pulse waveforms with a predetermined temporal spacing, and said pair of output pulses is provided from said two pulse waveforms received by a single receiver of said receiver means.
8. Apparatus according to claim 7 and including Doppler means for determining Doppler parameters from the output of said cross-correlation means.
9. Apparatus according to claim 8 and including resampling means coupled for resampling the output of the receiver means in response to the output of the Doppler means.
10. Apparatus according to any one of claims 2 to 6 and also according to any one of claims 7 to 9 for use with a target site which is emitting said at least two pulse waveforms with a predetermined temporal spacing followed by a third pulse waveform providing said same part of said received signal.
11. Apparatus according to any preceding claim wherein the output of at least one receiver is coupled to autocorrelation means.
12. Apparatus according to claim 11 wherein the autocorrelation means is provided between said receiving means and said cross-correlation means.
13. Apparatus according to claim 11 or claim 12 wherein multiple path determining means is coupled to the output of said autocorrelation means for determining multiple path propagation of the received said pulse signal.
14. Apparatus according to claim 13 and including means responsive to the output of said multiple path determining means for effectively synchronising and adding said target signal which has been received over at least two different said multiple paths.
15. Measuring equipment comprising measuring apparatus according to any preceding claim and further including a target unit for emitting a target signal from said target site.
16. Equipment according to claim 15 wherein said predetermined pulse signal comprises a pair of temporally spaced pulse waveforms.

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17. Equipment according to claim 16 wherein said pair of waveforms are frequency modulated waveforms.
18. Equipment according to claim 16 or claim 17 wherein said pair of waveforms are chirps.
19. Equipment according to any one of claims 16 to 18 wherein said pair of waveforms are identical.
20. Equipment according to claim 15 wherein said predetermined pulse signal comprises a digital waveform.
21. Equipment according to claim any one of claims 16 to 19 said pair of waveforms are followed by a digital waveform.
22. Equipment according to claim 20 or claim 21 wherein said digital waveform has good correlation properties.
23. Equipment according to any one of claim 20 to 22 wherein said digital waveform is selected from a pseudo-random maximal length sequence, a Gold code or a Kasami code.
24. Equipment according to any preceding claim together with claim 8 and including range determining means for determining a range from the timing of the received target pulse signal, said range determining means being coupled to the output of the Doppler means for correcting the range to take account of Doppler effects.
25. A method of determining the direction of a source of pulse signals, the method comprising receiving the same pulse at two spaced receivers to provide respective first and second outputs, correlating said first and second outputs against each other to determine the difference in time of arrival, and computing and angle relative to the line joining the receivers from the time difference and the spacing of the receivers.
26. A method of determining range of a target on the basis of the time of flight of signals transmitted between the target and a measuring unit, wherein the target provides a pair of pulses with a predetermined temporally spacing, the method including the step of receiving the temporally spaced pulses at the

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measuring unit, correlating one received pulse against the other and deriving Doppler information from the resulting signal, and using the Doppler information to correct the measured range.

27. A method according to claim 26 wherein the Doppler information is used to correct the time of flight prior to calculation of the range.